

**UNITED STATES DISTRICT COURT  
DISTRICT OF MINNESOTA**

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REGENTS OF THE UNIVERSITY OF  
MINNESOTA,

Plaintiff,

v.

Civil No. 14-4666 (JRT/TNL)

AT&T MOBILITY LLC,

Defendant

ERICSSON, INC. AND NOKIA OF AMERICA  
CORP.,

Intervenor Defendants

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REGENTS OF THE UNIVERSITY OF  
MINNESOTA,

Plaintiff,

v.

SPRINT SOLUTIONS, INC. AND SPRINT  
SPECTRUM L.P.,

Defendants,

Civil No. 14-4669 (JRT/TNL)

ERICSSON, INC., NOKIA OF AMERICA  
CORP., AND NOKIA SOLUTIONS AND  
NETWORKS US LLC,

Intervenor Defendants

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REGENTS OF THE UNIVERSITY OF  
MINNESOTA,

Plaintiff,

v.

T-MOBILE USA, INC.,

Civil No. 14-4671 (JRT/TNL)

Defendant,

ERICSSON, INC., NOKIA OF AMERICA  
CORP., AND NOKIA SOLUTIONS AND  
NETWORKS US LLC,

Intervenor Defendants

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REGENTS OF THE UNIVERSITY OF  
MINNESOTA,

Plaintiff,

v.

CELLCO PARTNERSHIP D/B/A VERIZON  
WIRELESS,

Civil No. 14-4672 (JRT/TNL)

Defendant,

ERICSSON, INC. AND NOKIA OF AMERICA  
CORP.,

Intervenor Defendants

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**MEMORANDUM OPINION AND ORDER ON DENYING DEFENDANTS' MOTION FOR  
SUMMARY JUDGMENT OF NON-INFRINGEMENT UNDER THE DOCTRINE OF  
EQUIVALENTS**

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Aamir Abdulqader Kazi, **FISH & RICHARDSON, PC**, 1180 Peachtree Street Northeast, Atlanta, GA 30309; Alex Rafferty, **FISH & RICHARDSON, PC**, 60 South Sixth Street, Suite 3200, Minneapolis, MN 55402; Frank E. Scherkenbach, Lawrence K. Kolodney, Whitney Reichel, and Daniel Haran Wade, **FISH & RICHARDSON, PC**, One Marina Park Drive, Boston, MA 02210; John-Paul Robert Fryckman, **FISH & RICHARDSON, PC**, 12860 El Camino Real, Suite 400, San Diego, CA 92130; Katherine D. Prescott, **FISH & RICHARDSON, PC**, 500 Arguello Street, Suite 400, Redwood City, CA 94603; Brian J. Slovut and Carrie Ryan Gallia, **OFFICE OF THE GENERAL COUNSEL FOR THE UNIVERSITY OF MINNESOTA**, 200 Oak Street Southeast, Suite 360, Minneapolis, MN 55455; William R. Woodford, **AVANTECH LAW, LLP**, 80 South Eighth Street, Suite 900, Minneapolis, MN 55402, for Plaintiff.

Barbara P. Berens, Kari S. Berman, and Carrie L. Zochert, **BERENS & MILLER, PA**, 80 South Eighth Street, Suite 3720, Minneapolis, MN 55402; Benjamin Hershkowitz, Josh A. Krevitt, Laura Corbin, and Robert Scott Roe, **GIBSON, DUNN & CRUTCHER LLP**, 200 Park Avenue, New York, NY 10166; Neema Jalali, **GIBSON, DUNN & CRUTCHER LLP**, 555 Mission Street, Suite 3000, San Francisco, CA 94105; Yeepay Audrey Yang, **GIBSON, DUNN & CRUTCHER LLP**, 2001 Ross Avenue, Suite 2100, Dallas, TX 75201, for Defendant AT&T Mobility LLC.

David E. Finkelson and George Brian Davis, **MCGUIRE WOODS LLP**, Gateway Plaza, 800 East Canal Street, Richmond, VA 23219; Jason W. Cook, **MCGUIRE WOODS LLP**, 2601 Olive Street, Suite 2100, Dallas, TX 75201; John A. Cotter and John Anders Kvinge, **LARKIN HOFFMAN DALY & LINDGREN, LTD**, 8300 Norman Center Drive, Suite 1000, Minneapolis, MN 55437, for Defendants Sprint Solutions, Inc, Sprint Spectrum, LP, T-Mobile USA, Inc.;

Frank C. Cimino, Jr., Jeffri A. Kaminski, and Leslie A. Lee, **VENABLE LLP**, 600 Massachusetts Avenue Northwest, Washington, DC 20001; Mark G. Schroeder, **TAFT STETTINIUS & HOLLISTER LLP**, 80 South Eighth Street, Suite 2200, Minneapolis, MN 55402, for Defendant Cellco Partnership d/b/a Verizon Wireless.

Casey Lynne Shomaker, Jonathan Nathaniel Powers, Nicolas M. Mathews, Alexander Jefferson Chern, and Warren H. Lipschitz, I, **MCKOOL SMITH, PC**, 300 Crescent Court, Suite 1500, Dallas, TX 75201; Kevin Hess, **MCKOOL SMITH, PC**, 303 Colorado Street, Suite 2100, Austin, TX 78701; Steven Peters, **MCKOOL SMITH, PC**, 1999 K Street Northwest, Suite 600, Washington, DC 20006; O. Joseph Balthazor, Jr. and Michael M. Lafeber, **TAFT STETTINIUS & HOLLISTER LLP**, 2200 IDS Center, 80 South Eighth Street, Minneapolis, MN 55402; Theodore Stevenson, III, **ALSTON & BIRD LLP**, 2200 Ross Avenue, Suite 2300, Dallas, TX 75201, for Defendant Intervenor Ericsson, Inc.

Brianne Straka, David Aaron Nelson, Marc Lawrence Kaplan, Nathaniel Andrew Hamstra, Athena Diane Dalton, Harrison Rose, and Rajat Khanna, **QUINN EMANUEL URQUHART & SULLIVAN, LLP**, 191 North Wacker Drive, Suite 2700, Chicago, IL 60606; Eva N. Edmonds, **QUINN EMANUEL URQUHART & SULLIVAN, LLP**, 111 Huntington Avenue, Suite 520, Boston, MA 02199; Jonathan A. Strauss, Christopher Proczko, Alexander J. Beeby, and Sonia L. Miller-Van Oort, **SAPIENTIA LAW GROUP, PLLC**, 120 South Sixth Street, Suite 100, Minneapolis, MN 55402, for Defendant Intervenor Nokia of America Corp. and Nokia Solutions and Networks US LLC.

Plaintiff Regents of the University of Minnesota (“Regents”) allege that the major mobile phone companies (“Defendants”) have infringed on five different patents. The Court has already determined that Regents’ infringement allegations on three of the five patents must be heard by a jury. The Court also determined that Defendants did not literally infringe the Linear Precoding Patents (“LP Patents”). The Court must now determine if any of Defendants’ asserted defenses—prosecution history estoppel, disclosure dedication, or claim vitiation—bar Regents’ claims of infringement under the doctrine of equivalents. Because none of the defenses bar Regents’ doctrine of equivalents patent infringement contentions, the Court will deny Defendants’ motion for summary judgment.

## **BACKGROUND**

The factual and procedural background of this technology and this case have been previously explained in the Court’s claim construction and summary judgment orders. *Regents of Univ. of Minn. v. AT&T Mobility LLC* (“*Claim Construction*”), No. 14-4666, 2022 WL 3142322, at \*1–3 (D. Minn. Aug. 5, 2022); *Univ. of Minn. v. AT&T Mobility, LLC* (“*Summary Judgment Order*”), No. 14-4666, 2024 WL 758541, at \*7 (D. Minn. Feb. 23, 2024).

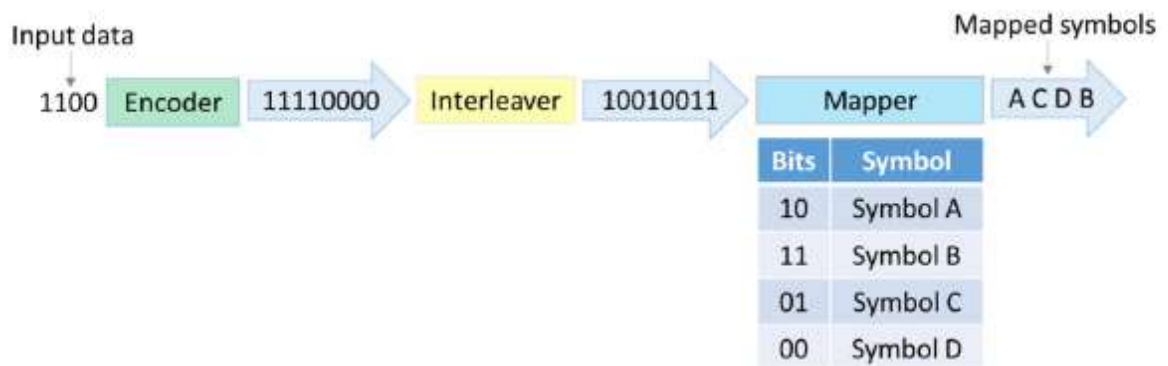
### **I. FACTS**

Understanding the defenses at issue here requires an understanding of the patents themselves and their prosecution history.

### A. LP PATENTS

Generally, the LP Patents U.S. Patent Numbers 7,251,768 (“768 patent”) and RE45,230 (“230 patent”)—involve digital coding techniques that improve the efficiency and accuracy of the transmission of data. *Claim Construction*, 2022 WL 3142322, at \*2. In a rudimentary way, the LP Patents improve the transmission of data through three steps: the data is encoded, then interleaved, and then mapped.<sup>1</sup> *Id.* The accused technology, in contrast, inserts a scrambling step between the interleaver and mapper. *Summary Judgment Order*, 2024 WL 758541, at \*7. Below is a graphic that explains the basic process of the LP Patents and the Accused Technology:

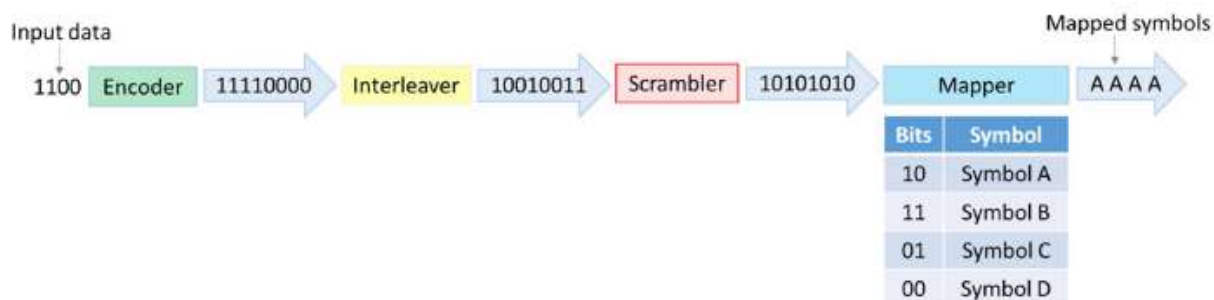
#### LP Patents:



#### Accused Technology:

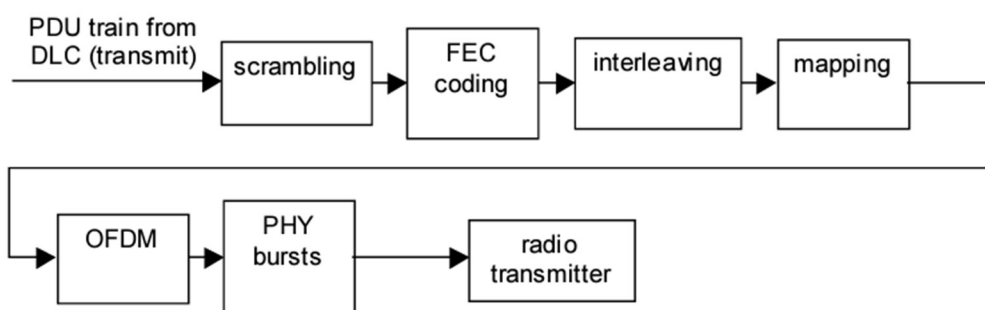
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<sup>1</sup> The basic framework is consistent across all embodiments described in the LP Patents.



*Id.*

Although the LP Patents do not include an explicit scrambling step in their claims, both patents discuss or incorporate by reference the HIPERLAN/2 standard for data transmission, which itself inserts a scrambler at the inception of the data transmission process. (Aff. of Jonathan Powers (“Powers Aff.”) ¶ 3, Ex. 3 (“768 patent”) at 3:66–4:1, Dec. 2, 2024, Docket No. 803;<sup>2</sup> Powers Aff. ¶ 2, Ex. 2 (“230 patent”) at 20:51–60; Powers Aff. ¶ 9, Ex. 9 § 6.2.)



(Powers Aff. ¶ 9, Ex. 9 § 6.2.)

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<sup>2</sup> All Docket Citations refer to Case No. 14-4666.

## B. PROSECUTION HISTORY

The prosecution history of the '768 and '230 patents is of particular importance in this case.

First, the '768 patent went through various changes from initial drafting to final approval. The relevant amendments were to claims 1 and 16(13).<sup>3</sup> The United States Patent and Trademark Office Examiner ("Examiner") initially rejected claims 1 and 16 of the '768 patent because they lacked an interleaver and a mapper between the non-linear coder and the linear pre-coder. (Powers Aff. ¶ 1, Ex. 1 ("768 History") at 37–38.) Ultimately, Regents amended its '768 patent to account for the gaps identified by the Examiner, and in its remarks, Regents explained that it was inserting information already disclosed in dependent claims. (*Id.* at 139.) Regents amended claim 1 of the '768 patent accordingly:

1. A wireless communication device comprising:
  - a non-linear coder that encodes a data stream to produce an encoded data stream;
  - a precoder that linearly precodes the encoded data stream to produce a precoded data stream; and
  - a modulator to produce an output waveform in accordance with the precoded data stream for transmission through a wireless channel.

(*Id.* at 19.)

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<sup>3</sup> When the issue claim number differs from the original claim number, the Court will include the issued claim number in parentheses.

Claim 1 (Currently Amended): A wireless communication device comprising:

an error-control coder that applies an error correction code ~~[[s]] to encode a data stream using a finite field having a limited alphabet size to produce an encoded data stream of information bearing symbols;~~

a bit interleaver to produce an interleaved data stream in which neighboring data bits of the encoded data stream are positioned to be mapped to different constellation symbols;

a mapping unit to map the interleaved data stream to the constellation symbols, wherein the constellation symbols are selected from a constellation having a finite alphabet;

a precoder that applies a linear transformation to the constellation symbols ~~linearly precodes the information bearing symbols of the encoded data stream using a complex field without restriction to an alphabet size to produce [[a]] precoded data stream symbols, wherein the precoded symbols are complex numbers that are not restricted to the finite alphabet of the constellation;~~

a symbol interleaver to process the precoded symbols to produce permuted blocks of the precoded symbols; and

a modulator to produce an output waveform in accordance with the permuted blocks of precoded symbols ~~precoded data stream~~ for transmission through a wireless channel.

(*Id.* at 129.)

The dependent claims that Regents alleges it integrated, dependent claims 5 and 6, read:

5. The wireless communication device of claim 1, further comprising a mapping unit to map the encoded data stream to constellation symbols.

6. The wireless communication device of claim 5, further comprising a bit interleaver to produce an interleaved data stream in which data bits of the encoded data stream are separated to cause the mapping unit to map neighboring bits to different ones of the constellation symbols.



(*Id.* at 19.)

Two other claims include almost identical amendments, claims 16(13) and 24(21).<sup>4</sup> (*Id.* at 132, 134.) However, the language in claims 16(13) and 24(21) differed slightly in that claim 16(13) maps “the neighboring data bits,” and claim 24(21) maps “the encoded data stream” in lieu of “the interleaved data” mapped in claim 1. (*Id.* at 129, 132, 134.)

Second, the ’230 patent emerged as a reissue of a prior patent, United States Patent No. 7,292,647. (Powers Aff. ¶ 6, Ex. 6 (“’230 History”) at 4.) Regents amended the ’230 patent to, “among other things, . . . address antecedent basis issues and/or fix minor typographical mistakes.” (*Id.* at 34.) Included in the amendment was the addition of language analogous to claim 1 of the ’768 patent, namely the insertion of an interleaver and mapper. (*Id.* at 16–31.)

## II. PROCEDURE

Regents originally served only literal infringement contentions of the LP Patents, but after additional discovery, Regents sought to amend its infringement contentions to also assert infringement under the doctrine of equivalents. (Mot. Leave to Amend Infringement Contentions, Dec. 16, 2022, Docket No. 392.) Magistrate Judge Tony N. Leung denied Regents’ request, but the Court overruled that decision in its summary judgment order and allowed Regents leave to assert its doctrine of equivalents theory

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<sup>4</sup> Claim 24(21) is a method claim not covered by Regents’ doctrine of equivalents theory of infringement, but nonetheless, the language is still instructive of the reasons for the amendments.

and reopen discovery. *Summary Judgment Order*, 2024 WL 758541, at \*8. The Court also determined that Defendants did not literally infringe on the LP Patents, because they inserted the additional scrambling step. *Id.*

Defendants now move for summary judgment, asking the Court to decide as a matter of law that under three separate defenses—prosecution history estoppel, disclosure dedication, and claim vitiation—Regents’ doctrine of equivalents theory of infringement fails. (Mot. Summ. J. for Leave to File Mot. Summ. J., Oct. 4, 2024, Docket No. 787; Mot. Summ. J., Dec. 2, 2024, Docket No. 800; Defs.’ Mem. Supp. at 8–9, Dec. 2, 2024, Docket No. 802.)

## DISCUSSION

### I. STANDARD OF REVIEW

Summary judgment is appropriate when there are no genuine issues of material fact, and the moving party can demonstrate that it is entitled to judgment as a matter of law. Fed. R. Civ. P. 56(a). A fact is material if it might affect the outcome of the case, and a dispute is genuine if the evidence is such that it could lead a reasonable jury to return a verdict for the nonmoving party. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986). A court considering a motion for summary judgment must view the facts in the light most favorable to the nonmoving party and give that party the benefit of all reasonable inferences to be drawn from those facts. *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 587 (1986). The nonmoving party may not rest on mere allegations or denials but must show, through the presentation of admissible evidence, that specific

facts exist creating a genuine issue for trial. *Anderson*, 477 U.S. at 256 (discussing Fed. R. Civ. P. 56(e)). “The mere existence of a scintilla of evidence in support of the plaintiff’s position will be insufficient; there must be evidence on which the jury could reasonably find for the plaintiff.” *Id.* at 252.

## II. ANALYSIS

Because the Court found that Defendants did not literally infringe on the LP Patents, Regents rests on the doctrine of equivalents to assert infringement of the LP Patents. The doctrine of equivalents allows patent holders to assert a theory of infringement when, though not literally infringed, insubstantial changes render an element equivalent. *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21 (1997). Regents asserts that, notwithstanding the literal insertion of the additional step of scrambling the data, the overall process is the same because the mapping element maps equivalent data.

Defendants assert three bars to Regents’ doctrine of equivalents infringement contentions: prosecution history estoppel, disclosure dedication, and claim vitiation. The Court determines the application of any bars to the doctrine of equivalents as a matter of law. *Warner-Jenkinson*, 520 U.S. at 39 n.8 (discussing prosecution history estoppel); *Pfizer, Inc. v. Teva Pharms., USA, Inc.*, 429 F.3d 1364, 1378 (Fed. Cir. 2005) (discussing disclosure dedication); *Trading Techs. Intern., Inc. v. eSpeed, Inc.*, 595 F.3d 1340, 1355 (Fed. Cir. 2010) (discussing claim vitiation).

### A. PROSECUTION HISTORY ESTOPPEL

Defendants first argue that when Regents narrowed the claims of the '768 patent for approval and the '230 on reissue, it surrendered any intermediary steps, such as scrambling, between interleaving and mapping such that the prosecution history bars Regents' theory of infringement under the doctrine of equivalents.

Prosecution history estoppel bars a patentee from asserting a doctrine of equivalents theory of infringement on material surrendered during patent prosecution. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.* ("*Festo II*"), 535 U.S. 722, 736 (2002). This bar to a doctrine of equivalents theory only applies though when an amendment narrows the literal scope of the claim, and that narrowing amendment was substantially related to patentability. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.* ("*Festo III*"), 344 F.3d 1359, 1366 (Fed. Cir. 2003). The *Warner-Jenkinson* presumption holds that, absent a reason for a narrowing amendment, courts presume that the patentee amended the patent for a substantial reason relating to patentability. *Warner-Jenkinson*, 520 U.S. at 33.

Prosecution history estoppel applies to both patents at issue here. Regents admits that the '768 patent was amended in order to secure the patent. And even though the '230 patent's narrowing occurred through a reissue application; the Court is unaware of any case that precludes the Court from applying the *Warner-Jenkinson* presumption to a voluntary reissue patent. Moreover, applying the *Warner-Jenkinson* presumption here promotes the goals of prosecution history estoppel—public notice of surrendered subject

matter and maintenance of the patentee's burden to show that an amendment was unrelated to patentability. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.* ("*Festo I*"), 234 F.3d 558, 567 (Fed. Cir. 2000), *judgment vacated*, *Festo II*, 535 U.S. 722 (2002). And the voluntariness of an amendment does not alone save it from prosecution history estoppel. *Pioneer Magnetics, Inc. v. Micro Linear Corp.*, 330 F.3d 1352, 1357 (Fed. Cir. 2003). The Court will therefore apply the *Warner-Jenkinson* presumption to the '230 reissue patent, as well.

Having determined that prosecution history estoppel applies to both patents, the Court presumes that the patentee has surrendered everything between the original claim limitation and the amended claim limitation— the *Festo* presumption. *Festo III*, 344 F.3d at 1367. The patentee can rebut the *Festo* presumption by showing that it did not surrender the accused equivalent. *Id.* Courts recognize three ways a patentee can overcome the *Festo* presumption: that the rationale underlying the amendment bears only a tangential relationship to the accused equivalent, that the equivalent was unforeseeable at the time of amendment, or that there was some other reason that the patentee could not have described the equivalent. *Bio-Rad Labs., Inc. v. 10X Genomics Inc.*, 967 F.3d 1353, 1364 (Fed. Cir. 2020). The only exception applicable here is tangential relation.

In applying the tangential relation exception, courts again look to the reason behind the amendment<sup>5</sup> and compare that reason to the accused equivalent to determine if the accused equivalent has been surrendered. *Ajinomoto Co. v. Int’l Trade Comm’n*, 932 F.3d 1342, 1354 (Fed. Cir. 2019) (“Our cases require the patentee to show that the way in which the alleged equivalent departs from what the claim limitation literally requires is tangential to the discernible objective reason for the narrowing amendment.”) The burden is on patentee to overcome this presumption, but the Court ultimately evaluates whether the patentee has met this burden by relying exclusively on the prosecution history. *Festo III*, 344 F.3d at 1370 (“Whether the patentee has established a merely tangential reason for a narrowing amendment is for the court to determine from the prosecution history record without the introduction of additional evidence . . .”).

The prosecution history does not support the broad surrender Defendants claim. Instead, the prosecution history shows that Regents drafted an application that left a gap in the independent claims between the non-linear coder and linear pre-coder, and that Regents filled that gap with elements already identified in the dependent claims. This

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<sup>5</sup> Because the patents are unquestionably related, as the Court identified in its Claim Construction order, 2022 WL 3142322, at \*8, the Court will use the ’768 patent prosecution history to evaluate both the ’768 patent and the ’230 reissue patent. *MBO Labs., Inc. v. Becton, Dickinson & Co.*, 602 F.3d 1306, 1318 (Fed. Cir. 2010); *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 980 (Fed. Cir. 1999).

reading is bolstered by the fact that the dependent claims did not directly connect the interleaver and mapper.

As initially filed, Regents original independent claim 1 did not include the interleaver or mapper found in the issued claim 1; instead, Regents included those elements in dependent claims 5 and 6. The Examiner rejected all of those claims but only referenced omitted elements in claim 1, not claims 5 and 6. In claim 1, the Examiner found an interleaver and mapper to be missing. Regents responded by informing the Examiner that in order to fill the gaps, it was incorporating the subject matter from the dependent claims.

Regents did not, however, directly copy the language from dependent claims 5 and 6 during its amendment of independent claim 1. The language in the issued claim ultimately had the mapper mapping “the interleaved data” and not “the encoded data.” As a practical matter, the mapping unit in Regents’ technology does map **the** interleaved data, which, as the Court has already held, results in no literal infringement.

But the usage of the language “the interleaved data” in claim 1 does not indicate that the mapper may only map the interleaved data to the exclusion of any other intervening steps, because amendments to other claims suggest a different conclusion. For example, original claim 16(13) was rejected for the same omissions as claim 1. In response, Regents incorporated identical language from the dependent claims so that the mapper maps “the neighboring data bits.” That incorporation is relevant for two reasons.

First, it demonstrates that Regents intended to incorporate the language already disclosed by the dependent claims which did not require a direct connection between the interleaver and mapper. Second, the Examiner's approval of different language to satisfy the same rejections indicates that the data input for the mapper was not limited to the interleaved data.

Because the prosecution history demonstrates an intent to fill the gap between the non-linear coder and linear precoder with an interleaver and mapper, but not to exclude the potential for other intermediary steps, such as a scrambler, prosecution history estoppel does not bar Regents' doctrine of equivalents theory of infringement.

#### **B. DISCLOSURE DEDICATION**

Defendants next allege that Regents dedicated to the public a scrambling step by disclosing the HIPERLAN/2 standard and failing to claim a scrambler. When a patentee discloses material but fails to claim that material, the material is dedicated to the public and cannot be reclaimed by a patentee under a doctrine of equivalents theory of infringement. *Johnson & Johnston Assocs. Inc. v. R.E. Serv. Co.*, 285 F.3d 1046, 1054 (Fed. Cir. 2002). But the disclosure must be specific enough that "one of ordinary skill in the art could identify the subject matter that had been disclosed and not claimed." *SanDisk Corp. v. Kingston Tech. Co.*, 695 F.3d 1348, 1364 (Fed. Cir. 2012) (quotation omitted). However, disclosure alone is insufficient; the subject matter also must have been "identified by the patentee as an alternative to a claim limitation." *Pfizer, Inc. v. Teva Pharms. USA, Inc.*, 429 F.3d 1364, 1379 (Fed. Cir. 2005).



When the purported disclosure is not explicit in the patent but rather incorporated by reference, courts perform a slightly different analysis. First, the patent must “inform one of ordinary skill that the incorporated document contains subject matter that is an alternative to a claim limitation.” *SanDisk*, 695 F.3d at 1366. Second, the incorporated document must disclose that alternative with “such specificity that one of ordinary skill in the art could identify the subject matter that had been disclosed and not claimed.” *Id.* (quoting *PSC Comp. Prods., Inc. v. Foxconn Intern., Inc.*, 355 F.3d 1353, 1360 (Fed. Cir. 2004)).

Here, the incorporation or discussion<sup>6</sup> of the HIPERLAN/2<sup>7</sup> standard would not inform one of ordinary skill in the art that the HIPERLAN/2 standard contains alternatives to any claim limitations. The HIPERLAN/2 standard includes a scrambler at the beginning of the data transmission, not between the interleaver and mapper. Defendants’ expert further testified that the HIPERLAN/2 standard does not contemplate moving the scrambler between the interleaver and mapper. (Decl. of Daniel Wade, Ex. 2 at 125:17–126:2, Dec. 23, 2024, Docket No. 810.) Because nothing indicates that a scrambler at the

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<sup>6</sup> It is undisputed that the ’768 patent does not incorporate by reference the HIPERLAN/2 standard and simply discusses it. While that may be an independent basis for rejecting the disclosure dedication bar to Regents’ doctrine of equivalents theory of infringement, the Court need not decide if discussion, in lieu of incorporation by reference, sufficiently triggers the disclosure dedication bar.

<sup>7</sup> There is a dispute over which version of this standard was incorporated. The ’230 patent incorporates the 1999 version, but the parties, including Regents, the patentees, are unable to provide the Court with that version. Accordingly, the Court will use the 2000 version of the HIPERLAN/2 standard.

beginning of the data transmission would function as an alternative to the mapping of interleaved data, scrambling at the precise location in the accused equivalent was not dedicated to the public. *See Pfizer*, 429 F.3d at 1379 (finding no public dedication when the disclosure does not identify an unclaimed alternative that functions as a claim limitation). Without dedication to the public of scrambling between the interleaver and mapping steps, Defendants are not entitled to summary judgment of non-infringement under a disclosure dedication defense.

### **C. CLAIM VITIATION**

Defendants finally argue that Regents' doctrine of equivalents theory vitiates the element that requires the mapper to directly map the interleaved data. If a finding of infringement would entirely vitiate a particular claim element, then the Court must rule as a matter of law that there is no infringement under the doctrine of equivalents. *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1279–80 (Fed. Cir. 2001). Courts must determine whether “an asserted equivalent represents an ‘insubstantial difference’ from the claimed element, or ‘whether the substitute element matches the function, way, and result of the claimed element.’” *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1356 (Fed. Cir. 2012); *see also Brilliant Instruments, Inc. v. GuideTech, LLC*, 707 F.3d 1342, 1347 (Fed. Cir. 2013) (“Vitiating applies when one of skill in the art would understand that the literal and substitute limitations are not interchangeable, not insubstantially different, and when they do not perform substantially the same function in substantially the same way, to accomplish substantially the same result.”).

Defendants' vitiation argument fails for the same reason as their prosecution history estoppel argument—nothing indicates that the mapper and interleaver must be directly connected without any intervening steps. Because the element that Defendants allege is vitiated is not an element at all and all other elements are literally present in the accused equivalent, nothing could be vitiated by the insertion of a scrambler.

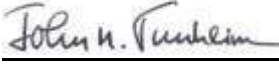
### **CONCLUSION**

Defendants argue that Regents' infringement contentions based on doctrine of equivalents are barred by three independent bases and so they are entitled to summary judgment. However, all of Defendants' defenses fail. The prosecution history indicates that Regents amended the patents to fill in essential elements but not to exclude a scrambler. Regents identified the HIPERLAN/2 standard, which uses a scrambler, but not in the same location as the accused equivalent, so it was not dedicated to the public. The interleaver and mapper need not be interconnected, so the insertion of a scrambler does not vitiate any elements. Accordingly, none of the bars proposed by Defendants are sufficient to grant summary judgment, so the Court will deny Defendants' motion for summary judgment of non-infringement of the LP Patents under the doctrine of equivalents.

**ORDER**

Based on the foregoing, and all the files, records, and proceedings herein, **IT IS HEREBY ORDERED** that Defendants' Motion for Summary Judgment of Non-Infringement of U.S. Patent Nos. 7,251,768 and RE45,230 Under the Doctrine of Equivalents [Docket No. 800]<sup>8</sup> is **DENIED**.

DATED: January 30, 2025  
at Minneapolis, Minnesota.

  
JOHN R. TUNHEIM  
United States District Judge

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<sup>8</sup> ECF No. 14-4669, Docket No. 799; ECF No. 14-4671, Docket No. 769; ECF No. 14-4672, Docket No. 806.